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EDITORIAL

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# Ralph W. Holzenthal – a mentor and friend retires

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## A much too brief CV

Ralph Holzenthal began his studies in caddisfly diversity at the University of New Orleans, where he completed his Masters of Science degree in 1980 after exploring the caddisfly of southeastern Louisiana and southern Mississippi, which was in his own words, "as far as I could travel in a day with a non-existing budget". Together with the research of Steve Harris and Paul Lago, Ralph's MSc thesis significantly contributed to advancing our knowledge of caddisflies in the Southeastern United States (Harris et al. 1982; Holzenthal et al. 1982; Lago et al. 1982). After considering several topics and advisors, Ralph joined John Morse at Clemson University for his Ph.D. on Neotropical Leptoceridae. Specifically, he assessed and analyzed the diversity, evolution, and biogeography of Neotropical Leptoceridae and revised their systematics. At Clemson he also met Steve Hamilton. Ralph and 'both Steves' developed very productive professional relationships and personal friendships that last through today. Thus, Ralph became part of a line of Trichoptera workers that would significantly impact our knowledge of the Trichoptera fauna of North and South America. First and foremost, this line goes back to Herbert Ross, Fernand Schmid, Glenn Wiggins, Oliver Flint, and John Morse.

During his graduate studies, Ralph attended his first International Symposium of Trichoptera at Clemson in 1983 and presented and published the first paper of

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his Ph.D. work in the symposium's proceedings: a description of the new genus *Achoropsyche* as the first contribution in the nine-part "Studies in Neotropical Leptoceridae" series (Holzenthal 1984). Perhaps more importantly he began many long-term relationships and friendships. He met Fernand Schmid of the Ministry of Agriculture Canada whose style and diligence in the preparation of Trichoptera he idolized and which Ralph has since passed on to generations of students. Through the Symposium he also intensified his interactions with Oliver Flint, an entomologist from the Smithsonian National Museum of Natural History, who became an important mentor for Ralph and whose collected material was the basis for a large part of Ralph's dissertation.

He completed his Ph.D. in Entomology at Clemson University in 1985. Ralph's Neotropical work then really took off when he received three National Science Foundation (NSF) grants to work on the caddisflies of Costa Rica. He began the first grant as a postdoctoral researcher at Clemson University in 1986 but was offered a faculty position as Faculty Director of the University of Minnesota Insect Collection (UMSP) at the University of Minnesota in spring of the same year. The grants and the work on Trichoptera of Costa Rica were instrumental to his tenure at UMSP. His six months sabbatical in 1997–1998 as visiting professor at the Universidade Federal do Paraná, Curitiba, Brazil was crucial to expanding his network in South America and broadening the taxonomic and regional scope of his work. The second influential grant to his career was a 2001 NSF "Partnerships for Enhancing Expertise in Taxonomy" (PEET) award. This grant, focused on formally training students in Trichoptera systematics and taxonomy, enabled Ralph to pursue one of his scientific career passions: training students from across the Americas in insect taxonomy, systematics, and biodiversity. He has since trained numerous younger colleagues through formal and informal avenues, thereby building a legacy of excellent Trichoptera taxonomists particularly known for their revisionary studies and excellent illustrations. Beyond teaching "standard" courses of an entomological curriculum, he also developed unique courses on scientific illustration of insects. These are sought after globally, and Ralph has been invited to give numerous workshops around the world to students and professionals. Ralph also excelled at communicating his knowledge with students. He was a cherished teacher and won multiple faculty teaching awards at the University of Minnesota. These included the FAME Award (Faculty Award for Mentorship in Entomology) presented through "Frenatae", the University of Minnesota's Entomology Graduate Student Organization in 2005 and 2010, which highlights how highly valued Ralph was as a teacher and mentor by his students. Many of his former mentees submitted articles to this volume, to show their gratitude and respect for Ralph's life work. The topics he thus influenced range from faunal surveys and checklists (Cavalcante-Silva et al. 2022; Chuluunbat et al. 2022; Houghton 2022; Luna-Luna et al. 2022) and ecological studies (Houghton et al. 2022; Ríos-Touma et al. 2022) to descriptive taxonomy (Bueno-Soria et al. 2022; Cavalcante-Silva et al. 2022; Martins et al. 2022; Pereira et al. 2022; Ramírez-

**Table 1.** Students mentored by R.W. Holzenthal (in reverse chronological order).

| M.Sc. | Ph.D. |
|---|---|
| Heather Cummins, 2014 | Luis Ernesto Rázuri-Gonzales, 2020 |
| Joel Gardner, 2013 (Co-Advisor with M. Spivak) | Lucas Marques de Carmargos, 2020 |
| Anne M. Wasmund, 2006 | Robin Thomson, 2014 |
| Dianne M. Crane, 1994 (Co-Advisor with R.D. Moon) | Desiree R. Robertson, 2010 |
| Margot P. Monson, 1994 | Maria Lourdes Chamorro, 2009 |
| Roger J. Blahnik, 1991 | Henrique Paprocki, 2008 |
| Roger M. Strand, 1991 | Fernando Muñoz Quesada, 2003 |
| | David Houghton, 2002 |
| | Aysha Prather, 2002 |
| | Roger J. Blahnik, 1996 |
| | Atilano Contreras-Ramos, 1996 |
| | Sonia M.N. Lazzari, 1990 |

Carmona et al. 2022; Rázuri-Gonzales et al. 2022) and systematic revisions (Blahnik and Andersen 2022; Sganga et al. 2022; Thomson et al. 2022a, b).

The impact of his scientific work on Neotropical and other Trichoptera is seen in the 708 species (Figs 1, 2) he has described in dozens of publications and compendia (e.g., Flint et al. 1999; Holzenthal and Calor 2017), the twelve new genera and subgenera described, the incredible collection he has built, and the many students he trained.

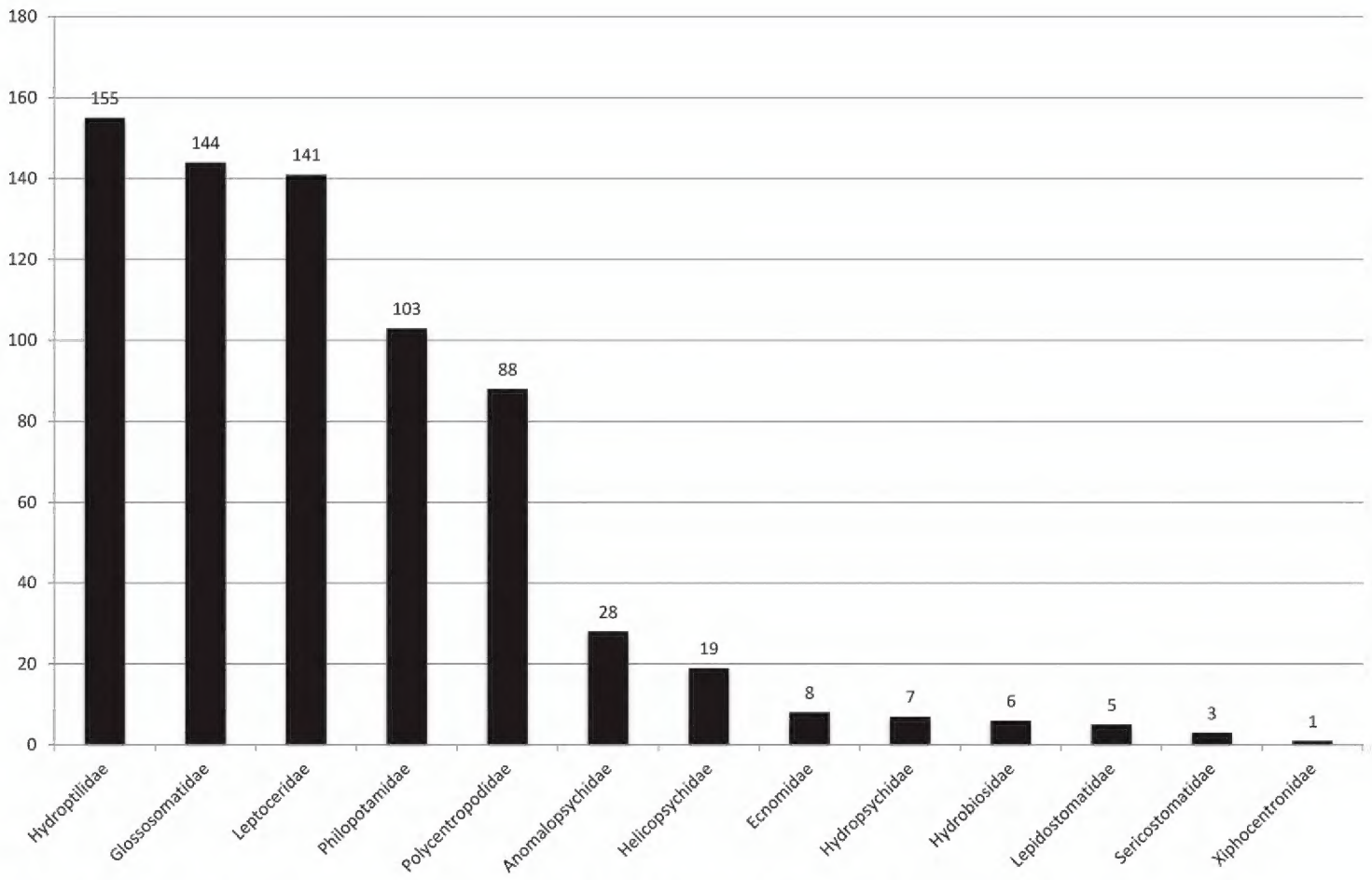


**Figure 1.** Number of new species described by R.W. Holzenthal by family (ordered by rank).

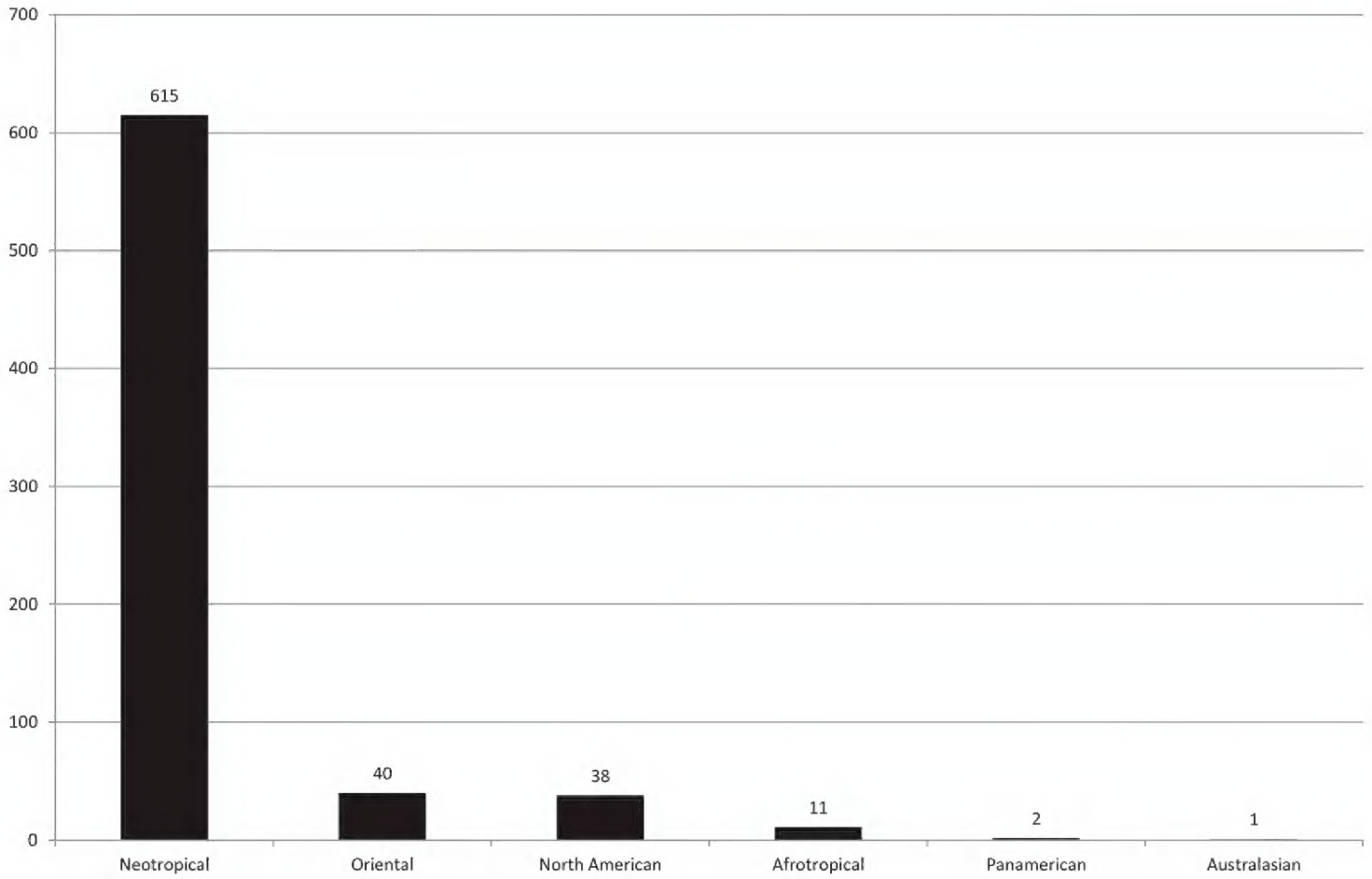


**Figure 2.** Number of species described by R.W. Holzenthal by biogeographical region (ordered by rank).

## Our interpretation of the scientific legacy of Ralph W. Holzenthal

Ralph's impact goes beyond pure numbers; his taxonomic contributions are characterized by particularly comprehensive treatments of morphology and species descriptions, often representing extensive revisions of taxonomic groups (e.g., Holzenthal 1982; Holzenthal and Flint 1995) or regional faunas (e.g., Andersen and Holzenthal 2001, 2002) and authoritative catalogues (Flint et al. 1999; Holzenthal and Calor 2017). This resulted in a body of work of lasting value that is still relevant today, decades later, and is used not only as a basis for identifications but also for further systematic work.

In our opinion, and this was passed on to us by Ralph's mentoring, excellent taxonomic publications not only clarify the morphological characters that are central to the identification of the taxa in question but also allow interpretation of homology of characters relevant for evolutionary analysis. Excellent and clear illustrations are central for this purpose. Ralph has developed his own style for traditionally and digitally inked line drawings and illustrations that succeed in being both unambiguous, thereby allowing identification, but also being sufficiently detailed to allow initial assessments of homology and convergence. He has introduced these methods to many subsequent generations through formal classes and informal courses and workshops.

Another cornerstone in Ralph's career has been an openness to innovative methodologies. Ralph conducted phylogenetic analyses to clarify evolutionary questions early in his doctoral studies, initially following the principles established by Hennig (1969). Hennigian phylogenetics were a major innovation in taxonomy at the time of Ralph's first studies, influencing his decision to work with John Morse for his Ph.D., as John

Morse was already using these methods. Throughout his career Ralph applied many methodological innovations to his work. These included digital approaches to illustration (Holzenthal 2008), database systems for collections management, and computer-generated natural language descriptions and taxonomic keys (e.g., DELTA; Dallwitz 1974, 1980). He later adopted the use of molecular data in phylogenetic systematics and developed them further in cooperation with colleagues (Kjer et al. 2001), up to current applications of genomics in phylogenetics (Thomson et al. 2022b). As Faculty Director of the University of Minnesota Insect Collection (UMSP), he leaves behind one of the foremost Neotropical Trichoptera collections in the world, and a well-curated insect collection of more than 4 million specimens where species level identification lies at an astonishing ~ 70%. All Trichoptera specimens are databased and have machine-readable barcode labels (for a searchable database of these specimens, see https://scan-bugs.org/portal/). This approach to taxonomy and systematics, not only for its own sake but also as a service to other scientists, is what we believe sets Ralph's contributions apart.

Ralph also has a strong awareness of obstacles to taxonomic publication and the central role of identification keys in organismal biology. This awareness led Ralph to join ZooKeys as a Trichoptera subject editor, where for five years his editorial leadership influenced many authors of excellent taxonomic papers. This is a further example of his service-oriented mindset.

But to what end did Ralph make these contributions? By making the world's caddisfly fauna more available to systematists as well as evolutionary and conservation biologists, Ralph has helped advance the taxonomy of Trichoptera beyond the pioneering efforts of Dr. Oliver S. Flint to a new stage of knowledge for the Neotropics. In addition to descriptive and revisionary taxonomy, he has also advocated for the value of museums and collections in an ongoing and uphill endeavor. In the face of global climate change, this is an enterprise that now seems more important than ever because the secure refuges set aside to protect species no longer seem so permanent or secure. Natural habitats have been disappearing at alarming rates for the last few decades, which impacts our livelihoods and welfare. Biological inventories in turn raise awareness of the benefits of protecting these habitats and the biodiversity they hold. However, particularly in the tropics, these inventories usually focus on relatively well-known, easily identifiable, or charismatic groups such as birds, mammals, butterflies, and ants, while many other groups are scarcely known. By subsequently establishing protected areas known to be diverse, conservationists and biodiversity researchers aspire that these less well-known groups can also be protected and eventually described. At the rate natural habitats are being destroyed, however, it is unlikely the focus on few protected areas will suffice to preserve all the hitherto unknown diversity.

In a recent paper, Ralph and colleagues recorded 310 caddisfly species from Ecuador and estimated that only 54% of the Trichoptera fauna from this country is known to science (Ríos-Touma et al. 2017). Moreover, several Neotropical genera found in Ecuador are highly endemic at the species level (e.g., *Amphoropsyche*, *Atanatolica*, and *Contulma*), with new genera and species routinely discovered and described in these areas (Holzenthal et al. 2017, 2018). The same scenario applies in the forests of other tropical countries, and estimating how many additional species may have initially been present before these forests were deforested is impossible to accomplish.

Beyond diversity predictions and reserving natural habitats in the hope of protecting diversity, a fundamental concern for the loss of species should begin with a sense of urgency to know what might be lost. Because species are not really fathomable until they are more than theoretical numbers. How can one truly mourn the loss of species that were not even known to exist? How will one know that they were truly lost if there are no records that they existed in the first place? How do we still have such a poor knowledge of our planet's biodiversity after more than 250 years naming species? If the diversity of species on the planet is as great as scientists have estimated, why does the description of biodiversity of the planet receive such a low priority?

Ralph understands that providing empirical evidence and a comprehensible characterization of biological diversity is of utmost importance to supporting conservation efforts. After a stellar career in taxonomy, with the description of hitherto 708 species previously unknown to science (see Figs 1, 2), Ralph can join the ranks of the many thousands of taxonomists who have contributed to the description of the Earth's biological diversity. Many of his descriptions were conducted with students he trained, thereby ensuring a lasting legacy of his work and his ideas on high-quality approaches to taxonomy that will transcend through generations.

Over the years, Ralph's thinking and his approach to taxonomy have inspired many others, especially young scientists and students, as is evident in the articles in this issue. Perhaps more importantly, all his students maintain a love and appreciation of both taxonomy and the diversity of aquatic insects. Ralph's knowledge and enthusiasm for these topics has impressed his students to such a degree that they all maintained subject and mentor close to their hearts.

## List of publications

### 1980

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## New genera and subgenera circumscribed by R.W. Holzenthal

*Achoropsyche* Holzenthal, 1984
*Amazonatolica* Holzenthal & Pes, 2004
*Amphoropsyche* Holzenthal, 1985
*Aymaradella* Holzenthal, Blahnik & Ríos-Touma, 2018
*Fernandoschmidia* Holzenthal & Andersen, 2007
*Mejicanotrichia* Harris & Holzenthal, 1997
*Mortoniella* (*Nanotrichia*) Blahnik & Holzenthal, 2017
*Neoathripsodes* Holzenthal, 1989
*Notalina* (*Neonotalina*) Holzenthal, 1986
*Orinochotrichia* Harris, Flint & Holzenthal, 2002
*Osflintia* Calor & Holzenthal, 2008
*Tizatetrichia* Harris, Flint & Holzenthal, 2002

## New species described by R.W. Holzenthal (arranged alphabetically by family and species)

### Anomalopsychidae

*Contulma adamsae* Holzenthal & Flint, 1995
*Contulma bacula* Holzenthal & Flint, 1995
*Contulma boliviensis* Holzenthal & Robertson, 2006
*Contulma caldensis* Holzenthal & Flint, 1995
*Contulma cataracta* Holzenthal & Flint, 1995
*Contulma colombiensis* Holzenthal & Flint, 1991
*Contulma costaricensis* Holzenthal & Flint, 1995
*Contulma echinata* Holzenthal & Flint, 1995
*Contulma ecuadorensis* Holzenthal & Flint, 1995
*Contulma fluminensis* Holzenthal & Robertson, 2006
*Contulma inornata* Holzenthal & Flint, 1995
*Contulma lanceolata* Holzenthal & Flint, 1995
*Contulma lina* Holzenthal, Ríos-Touma & Rázuri-Gonzales, 2017
*Contulma meloi* Holzenthal & Robertson, 2006
*Contulma nevada* Holzenthal & Flint, 1995
*Contulma paluguillensis* Holzenthal & Ríos-Touma, 2012
*Contulma papallacta* Holzenthal & Flint, 1995
*Contulma penai* Holzenthal & Flint, 1995
*Contulma quito* Holzenthal, Ríos-Touma & Rázuri-Gonzales, 2017
*Contulma sancta* Holzenthal & Flint, 1995
*Contulma sangay* Holzenthal, Ríos-Touma & Rázuri-Gonzales, 2017
*Contulma spinosa* Holzenthal & Flint, 1991
*Contulma talamanca* Holzenthal & Flint, 1995
*Contulma tapanti* Holzenthal & Flint, 1995
*Contulma tica* Holzenthal & Flint, 1995
*Contulma tijuca* Holzenthal & Flint, 1995
*Contulma tripui* Holzenthal & Robertson, 2006
*Contulma valverdei* Holzenthal & Flint, 1995

### Ecnomidae

*Austrotinodes abrachium* Thomson & Holzenthal, 2010
*Austrotinodes belchioris* Thomson & Holzenthal, 2010
*Austrotinodes boliviensis* Thomson & Holzenthal, 2010
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*Austrotinodes doublesi* Munioz-Quesada & Holzenthal, 1993
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*Culoptila buenoi* Blahnik & Holzenthal, 2006
*Culoptila cascada* Blahnik & Holzenthal, 2006
*Culoptila hamata* Blahnik & Holzenthal, 2006
*Culoptila pararusia* Blahnik & Holzenthal, 2006
*Culoptila plummerensis* Blahnik & Holzenthal, 2006
*Culoptila tapanti* Blahnik & Holzenthal, 2006
*Culoptila unispina* Blahnik & Holzenthal, 2006
*Culoptila vexillifera* Blahnik & Holzenthal, 2006
*Itauara alexanderi* Robertson & Holzenthal, 2011
*Itauara bidentata* Robertson & Holzenthal, 2011
*Itauara blahniki* Robertson & Holzenthal, 2011
*Itauara charlotta* Robertson & Holzenthal, 2011
*Itauara emilia* Robertson & Holzenthal, 2011
*Itauara flinti* Robertson & Holzenthal, 2011
*Itauara guyanensis* Robertson & Holzenthal, 2011
*Itauara jamesii* Robertson & Holzenthal, 2011
*Itauara julia* Robertson & Holzenthal, 2011
*Itauara lucinda* Robertson & Holzenthal, 2011
*Itauara ovis* Robertson & Holzenthal, 2011
*Itauara peruensis* Robertson & Holzenthal, 2011
*Itauara rodmani* Robertson & Holzenthal, 2011
*Itauara simplex* Robertson & Holzenthal, 2011
*Itauara spiralis* Robertson & Holzenthal, 2011
*Itauara stella* Robertson & Holzenthal, 2011
*Itauara tusci* Robertson & Holzenthal, 2011
*Itauara unidentata* Robertson & Holzenthal, 2011
*Mastigoptila complicornuta* Holzenthal, 2004
*Mastigoptila elae* Holzenthal, 2004
*Mortoniella acauda* Blahnik & Holzenthal, 2011
*Mortoniella acutiterga* Blahnik & Holzenthal, 2017
*Mortoniella adamsae* Blahnik & Holzenthal, 2017
*Mortoniella agosta* Blahnik & Holzenthal, 2011
*Mortoniella akantha* Blahnik & Holzenthal, 2008
*Mortoniella akrogeneios* Blahnik & Holzenthal, 2017
*Mortoniella anakantha* Blahnik & Holzenthal, 2008
*Mortoniella applanata* Blahnik & Holzenthal, 2017
*Mortoniella asymmetris* Blahnik & Holzenthal, 2011
*Mortoniella auricularis* Blahnik & Holzenthal, 2017
*Mortoniella aviceps* Blahnik & Holzenthal, 2008

*Mortoniella barinasi* Blahnik & Holzenthal, 2017
*Mortoniella biramosa* Blahnik & Holzenthal, 2017
*Mortoniella bocaina* Blahnik & Holzenthal, 2011
*Mortoniella bothrops* Blahnik & Holzenthal, 2017
*Mortoniella brachyrhachos* Blahnik & Holzenthal, 2008
*Mortoniella brevis* Blahnik & Holzenthal, 2017
*Mortoniella buenoi* Blahnik & Holzenthal, 2008
*Mortoniella bulbosa* Blahnik & Holzenthal, 2017
*Mortoniella carinula* Blahnik & Holzenthal, 2008
*Mortoniella catherinae* Blahnik & Holzenthal, 2017
*Mortoniella caudicula* Blahnik & Holzenthal, 2008
*Mortoniella chalalan* Blahnik & Holzenthal, 2017
*Mortoniella cognata* Blahnik & Holzenthal, 2017
*Mortoniella coheni* Blahnik & Holzenthal, 2017
*Mortoniella cornuta* Blahnik & Holzenthal, 2017
*Mortoniella crescentis* Blahnik & Holzenthal, 2011
*Mortoniella cressae* Blahnik & Holzenthal, 2017
*Mortoniella croca* Blahnik & Holzenthal, 2017
*Mortoniella curtispina* Blahnik & Holzenthal, 2017
*Mortoniella curvistylus* Blahnik & Holzenthal, 2017
*Mortoniella dentiterga* Blahnik & Holzenthal, 2017
*Mortoniella dinotes* Blahnik & Holzenthal, 2017
*Mortoniella dolonis* Blahnik & Holzenthal, 2011
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*Mortoniella emarginata* Blahnik & Holzenthal, 2017
*Mortoniella esrossi* Blahnik & Holzenthal, 2017
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*Mortoniella flexuosa* Blahnik & Holzenthal, 2017
*Mortoniella froehlichi* Blahnik & Holzenthal, 2011
*Mortoniella furcula* Blahnik & Holzenthal, 2017
*Mortoniella gilli* Blahnik & Holzenthal, 2017
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*Mortoniella guahybae* Blahnik & Holzenthal, 2011
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*Mortoniella hystricosa* Blahnik & Holzenthal, 2011
*Mortoniella intervales* Blahnik & Holzenthal, 2011
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*Mortoniella longiterga* Blahnik & Holzenthal, 2017

*Mortoniella meloi* Blahnik & Holzenthal, 2011
*Mortoniella membranacea* Blahnik & Holzenthal, 2017
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*Mortoniella monopodis* Blahnik & Holzenthal, 2017
*Mortoniella munozi* Blahnik & Holzenthal, 2008
*Mortoniella opinionis* Blahnik & Holzenthal, 2008
*Mortoniella panamensis* Blahnik & Holzenthal, 2008
*Mortoniella papillata* Blahnik & Holzenthal, 2008
*Mortoniella paraguaiensis* Blahnik & Holzenthal, 2011
*Mortoniella parameralda* Blahnik & Holzenthal, 2017
*Mortoniella parauna* Blahnik & Holzenthal, 2011
*Mortoniella paraunota* Blahnik & Holzenthal, 2011
*Mortoniella paucispina* Blahnik & Holzenthal, 2017
*Mortoniella pectinella* Blahnik & Holzenthal, 2008
*Mortoniella pica* Blahnik & Holzenthal, 2017
*Mortoniella proakantha* Blahnik & Holzenthal, 2017
*Mortoniella prolata* Blahnik & Holzenthal, 2017
*Mortoniella propinqua* Blahnik & Holzenthal, 2008
*Mortoniella pumila* Blahnik & Holzenthal, 2011
*Mortoniella pusilla* Blahnik & Holzenthal, 2011
*Mortoniella quadridactyla* Blahnik & Holzenthal, 2017
*Mortoniella quadrispina* Blahnik & Holzenthal, 2017
*Mortoniella rectiflexa* Blahnik & Holzenthal, 2017
*Mortoniella redunca* Blahnik & Holzenthal, 2008
*Mortoniella rodmani* Blahnik & Holzenthal, 2008
*Mortoniella ruedae* Blahnik & Holzenthal, 2017
*Mortoniella schlingeri* Blahnik & Holzenthal, 2017
*Mortoniella sicula* Blahnik & Holzenthal, 2008
*Mortoniella silacea* Blahnik & Holzenthal, 2017
*Mortoniella simplicis* Blahnik & Holzenthal, 2017
*Mortoniella sinuosa* Blahnik & Holzenthal, 2017
*Mortoniella spangleri* Blahnik & Holzenthal, 2017
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*Mortoniella stilula* Blahnik & Holzenthal, 2008
*Mortoniella tanyrhabdos* Blahnik & Holzenthal, 2017
*Mortoniella tapanti* Blahnik & Holzenthal, 2008
*Mortoniella taurina* Blahnik & Holzenthal, 2008
*Mortoniella triangularis* Blahnik & Holzenthal, 2017
*Mortoniella tridens* Blahnik & Holzenthal, 2017
*Mortoniella tripuiensis* Blahnik & Holzenthal, 2011
*Mortoniella triramosa* Blahnik & Holzenthal, 2017
*Mortoniella truncata* Blahnik & Holzenthal, 2011
*Mortoniella tusci* Blahnik & Holzenthal, 2017

*Mortoniella umbonata* Blahnik & Holzenthal, 2008
*Mortoniella uruguaiensis* Blahnik & Holzenthal, 2011
*Mortoniella variabilis* Blahnik & Holzenthal, 2017
*Mortoniella venezuelensis* Blahnik & Holzenthal, 2017
*Mortoniella zamora* Blahnik & Holzenthal, 2017
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*Protoptila diablita* Robertson & Holzenthal, 2008
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*Protoptila julieta* Robertson & Holzenthal, 2008
*Protoptila kjeri* Holzenthal & Blahnik, 2006
*Protoptila strepsicera* Holzenthal & Blahnik, 2006
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*Helicopsyche angeloi* Holzenthal, Blahnik & Calor, 2016
*Helicopsyche auroa* Johanson & Holzenthal, 2004
*Helicopsyche camuriensis* Johanson & Holzenthal, 2004
*Helicopsyche circulata* Johanson & Holzenthal, 2004
*Helicopsyche disjuncta* Johanson & Holzenthal, 2004
*Helicopsyche dorsocurvata* Johanson & Holzenthal, 2010
*Helicopsyche golfitoensis* Johanson & Holzenthal, 2010
*Helicopsyche guara* Holzenthal, Blahnik & Calor, 2016
*Helicopsyche laneblina* Johanson & Holzenthal, 2004
*Helicopsyche lara* Johanson & Holzenthal, 2004
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*Helicopsyche linabena* Johanson & Holzenthal, 2004
*Helicopsyche neblinensis* Johanson & Holzenthal, 2004
*Helicopsyche perija* Johanson & Holzenthal, 2004
*Helicopsyche succincta* Johanson & Holzenthal, 2004
*Helicopsyche sucrensis* Johanson & Holzenthal, 2004
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*Atopsyche allani* Holzenthal & Cressa, 2002
*Atopsyche blahniki* Santos & Holzenthal, 2012

*Atopsyche galharada* Santos & Holzenthal, 2012
*Atopsyche parauna* Santos & Holzenthal, 2012
*Atopsyche rinconi* Holzenthal & Cressa, 2002
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*Smicridea lourditae* Pauls, Blahnik, Zhou, Wardwell & Holzenthal, 2010
*Smicridea nemorosa* Holzenthal & Blahnik, 1995
*Smicridea patinae* Pauls, Blahnik & Holzenthal, 2010
*Smicridea singri* Holzenthal & Blahnik, 1995
*Smicridea tapanti* Holzenthal & Blahnik, 1995
*Smicridea travertinera* Paprocki, Holzenthal & Cressa, 2003

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*Angrisanoia otarosa* Wasmund & Holzenthal, 2007
*Angrisanoia shorti* Thomson & Holzenthal, 2012
*Bredinia alza* Harris, Holzenthal & Flint, 2002
*Bredinia davenporti* Harris, Holzenthal & Flint, 2002
*Bredinia emarginata* Harris, Holzenthal & Flint, 2002
*Bredinia espinosa* Harris, Holzenthal & Flint, 2002
*Bredinia guanacasteca* Harris, Holzenthal & Flint, 2002
*Bredinia manabiensis* Harris, Holzenthal & Flint, 2002
*Bredinia mexicana* Harris, Holzenthal & Flint, 2002
*Bredinia pilcopata* Harris, Holzenthal & Flint, 2002
*Bredinia selva* Harris, Holzenthal & Flint, 2002
*Bredinia spangleri* Harris, Holzenthal & Flint, 2002
*Bredinia sucrensis* Harris, Holzenthal & Flint, 2002
*Bredinia venezuelensis* Harris, Holzenthal & Flint, 2002
*Bredinia zulia* Harris, Holzenthal & Flint, 2002
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*Byrsopteryx chaconi* Harris & Holzenthal, 1994
*Byrsopteryx cuchilla* Harris & Holzenthal, 1994
*Byrsopteryx esparta* Harris & Holzenthal, 1994
*Byrsopteryx espinhosa* Harris & Holzenthal, 1994
*Byrsopteryx gomezi* Harris & Holzenthal, 1994
*Byrsopteryx loja* Harris & Holzenthal, 1994
*Byrsopteryx rayada* Harris & Holzenthal, 1994
*Byrsopteryx solisi* Harris & Holzenthal, 1994
*Byrsopteryx tapanti* Harris & Holzenthal, 1994

*Byrsopteryx tica* Harris & Holzenthal, 1994
*Costatrichia carara* Holzenthal & Harris, 1999
*Costatrichia cressae* Holzenthal & Harris, 1999
*Costatrichia flinti* Holzenthal & Harris, 1999
*Flintiella alajuela* Harris, Flint & Holzenthal, 2002
*Flintiella astilla* Harris, Flint & Holzenthal, 2002
*Flintiella boraceia* Harris, Flint & Holzenthal, 2002
*Flintiella heredia* Harris, Flint & Holzenthal, 2002
*Flintiella panamensis* Harris, Flint & Holzenthal, 2002
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*Hydroptila maritza* Harris & Holzenthal, 1999
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*Hydroptila rastrilla* Harris & Holzenthal, 1999
*Hydroptila roberta* Hamilton & Holzenthal, 1984
*Hydroptila singri* Harris & Holzenthal, 1999
*Hydroptila tridentata* Holzenthal & Kelley, 1983
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*Leucotrichia denticulata* Thomson & Holzenthal, 2015
*Leucotrichia dianeae* Thomson & Holzenthal, 2015
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*Leucotrichia hispida* Thomson & Holzenthal, 2015
*Leucotrichia kateae* Thomson & Holzenthal, 2015
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*Metrichia acicula* Bueno-Soria & Holzenthal, 2003

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*Metrichia amplitudinis* Bueno-Soria & Holzenthal, 2003
*Metrichia ancora* Bueno-Soria & Holzenthal, 2003
*Metrichia angulosa* Bueno-Soria & Holzenthal, 2003
*Metrichia bostrychion* Thomson & Holzenthal, 2012
*Metrichia decora* Bueno-Soria & Holzenthal, 2003
*Metrichia gordita* Bueno-Soria & Holzenthal, 2003
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*Metrichia magna* Bueno-Soria & Holzenthal, 2003
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*Metrichia meta* Bueno-Soria & Holzenthal, 2003
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*Metrichia prolata* Bueno-Soria & Holzenthal, 2003
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*Metrichia spica* Bueno-Soria & Holzenthal, 2003
*Metrichia triquetra* Bueno-Soria & Holzenthal, 2003
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*Nothotrichia munozi* Holzenthal & Harris, 2002
*Nothotrichia tupi* Holzenthal & Harris, 2022
*Ochrotrichia affinis* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia alargada* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia amorfa* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia assita* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia avicula* Bueno-Soria & Holzenthal, 2008
*Ochrotrichia avis* Bueno-Soria & Holzenthal, 1998
*Ochrotrichia bractea* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia catarina* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia citra* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia compacta* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia conformalis* Bueno-Soria & Holzenthal, 2008
*Ochrotrichia curvata* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia cuspidata* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia delgada* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia dulcea* Bueno-Soria & Holzenthal, 1998
*Ochrotrichia indefinida* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia involuta* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia ixtlahuaca* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia jolandae* Bueno-Soria & Holzenthal, 2008
*Ochrotrichia leona* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia longispina* Bueno-Soria & Holzenthal, 2004

*Ochrotrichia membrana* Bueno-Soria & Holzenthal, 1998
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*Ochrotrichia quasi* Bueno-Soria & Holzenthal, 2008
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*Ochrotrichia spira* Thomson & Holzenthal, 2012
*Ochrotrichia unicornia* Bueno-Soria & Holzenthal, 2004
*Ochrotrichia vieja* Bueno-Soria & Holzenthal, 1998
*Ochrotrichia yavesia* Bueno-Soria & Holzenthal, 2004
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*Oxyethira apinolada* Holzenthal & Harris, 1992
*Oxyethira bettyae* Thomson & Holzenthal, 2012
*Oxyethira cuernuda* Holzenthal & Harris, 1992
*Oxyethira culebra* Holzenthal & Harris, 1992
*Oxyethira espinada* Holzenthal & Harris, 1992
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*Oxyethira itascae* Monson & Holzenthal, 1993
*Oxyethira kingi* Holzenthal & Kelley, 1983
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*Oxyethira rareza* Holzenthal & Harris, 1992
*Oxyethira redunca* Thomson & Holzenthal, 2012
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*Rhyacopsyche benwa* Wasmund & Holzenthal, 2007
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*Rhyacopsyche colei* Wasmund & Holzenthal, 2007
*Rhyacopsyche colombiana* Wasmund & Holzenthal, 2007
*Rhyacopsyche colubrinosa* Wasmund & Holzenthal, 2007
*Rhyacopsyche dikrosa* Wasmund & Holzenthal, 2007
*Rhyacopsyche flinti* Wasmund & Holzenthal, 2007
*Rhyacopsyche hasta* Wasmund & Holzenthal, 2007
*Rhyacopsyche intraspira* Wasmund & Holzenthal, 2007
*Rhyacopsyche rhamphisa* Wasmund & Holzenthal, 2007
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*Amphoropsyche aragua* Holzenthal, 1985
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*Amphoropsyche carchi* Rázuri-Gonzales, Holzenthal & Ríos-Touma, 2017
*Amphoropsyche cauca* Holzenthal, 1985
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*Amphoropsyche matsigenka* Rázuri-Gonzales, Holzenthal & Ríos-Touma, 2017
*Amphoropsyche napo* Holzenthal, 1985
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*Amphoropsyche real* Holzenthal, 2016
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*Amphoropsyche spinifera* Holzenthal, 1986
*Amphoropsyche stellata* Holzenthal, 1985
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*Atanatolica aurea* Holzenthal, 1988
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*Atanatolica choco* Holzenthal, 1988
*Atanatolica cotopaxi* Holzenthal, 1988
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*Atanatolica manabi* Holzenthal, 2018
*Atanatolica moselyi* Denning & Holzenthal, 1988
*Atanatolica muyupampa* Holzenthal, 2018
*Atanatolica nigra* Holzenthal, 2018
*Atanatolica nivea* Holzenthal, 2018
*Atanatolica panamensis* Holzenthal, 2018
*Atanatolica penai* Holzenthal, 2018

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*Fernandoschmidia amudita* Holzenthal & Andersen, 2007
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*Grumichella blahniki* Calor & Holzenthal, 2016
*Grumichella boraceia* Calor & Holzenthal, 2016
*Grumichella cressae* Calor & Holzenthal, 2016
*Grumichella jureia* Calor & Holzenthal, 2016
*Grumichella leccii* Calor & Holzenthal, 2016
*Grumichella muelleri* Calor & Holzenthal, 2016
*Grumichella paprockii* Calor & Holzenthal, 2016
*Grumichella parati* Calor & Holzenthal, 2016
*Grumichella trujilloi* Calor & Holzenthal, 2016
*Nectopsyche exophthalma* Holzenthal, 1995
*Nectopsyche monticola* Holzenthal, 1995
*Nectopsyche navasi* Holzenthal, 2000
*Nectopsyche onyx* Holzenthal, 1995
*Nectopsyche ortizi* Holzenthal, 1995
*Nectopsyche padrenavasi* Holzenthal, 2000
*Nectopsyche tapanti* Holzenthal, 1995
*Nectopsyche tuanis* Holzenthal, 1995
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*Neoathripsodes anomalus* Holzenthal, 1989
*Neoatriplectides froehlichi* Holzenthal, 1997
*Notalina brasiliana* Holzenthal, 1986
*Notalina cipo* Holzenthal, 1986
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*Notalina hamiltoni* Holzenthal, 1986
*Notalina matthiasi* Holzenthal, 1986
*Notalina morsei* Holzenthal, 1986
*Notalina nanay* Holzenthal, 1986
*Notalina paulista* Calor & Holzenthal, 2006
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*Oecetis acciptrina* Blahnik & Holzenthal, 2014
*Oecetis acuticlasper* Quinteiro & Holzenthal, 2017
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*Oecetis apache* Blahnik & Holzenthal, 2014
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*Chimarra xiphosella* Blahnik, Holzenthal & Huisman, 2009
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*Chimarrhodella costaricensis* Blahnik & Holzenthal, 1992
*Chimarrhodella flinti* Blahnik & Holzenthal, 1992
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*Chimarrhodella tobagoensis* Blahnik & Holzenthal, 1992
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*Wormaldia cornuta* Bueno-Soria & Holzenthal, 1986
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*Wormaldia eberhardi* Munoz-Quesada & Holzenthal, 2015
*Wormaldia flinti* Munoz-Quesada & Holzenthal, 2015
*Wormaldia francovilla* Munoz-Quesada & Holzenthal, 2015
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*Wormaldia imbrialis* Holzenthal, Blahnik & Ríos-Touma, 2018
*Wormaldia inca* Munoz-Quesada & Holzenthal, 2015
*Wormaldia isela* Munoz-Quesada & Holzenthal, 2015
*Wormaldia juarox* Munoz-Quesada & Holzenthal, 2015
*Wormaldia lauglo* Munoz-Quesada & Holzenthal, 2015
*Wormaldia luma* Bueno-Soria & Holzenthal, 1986
*Wormaldia machadorum* Munoz-Quesada & Holzenthal, 2015
*Wormaldia maesi* Munoz-Quesada & Holzenthal, 2015
*Wormaldia menchuae* Munoz-Quesada & Holzenthal, 2015
*Wormaldia monsonorum* Munoz-Quesada & Holzenthal, 2015
*Wormaldia navarroae* Munoz-Quesada & Holzenthal, 2015
*Wormaldia paprockevi* Munoz-Quesada & Holzenthal, 2015
*Wormaldia saboriorum* Munoz-Quesada & Holzenthal, 2015
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*Wormaldia tocajoma* Munoz-Quesada & Holzenthal, 2015
*Wormaldia trondi* Munoz-Quesada & Holzenthal, 2015
*Wormaldia tupacamara* Munoz-Quesada & Holzenthal, 2015
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*Polycentropus acinaciformis* Hamilton & Holzenthal, 2011
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*Polycentropus ancistrus* Hamilton & Holzenthal, 2011
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*Polycentropus cressae* Hamilton & Holzenthal, 2005
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*Polycentropus fluminensis* Hamilton & Holzenthal, 2011
*Polycentropus fortispinus* Holzenthal & Hamilton, 1988
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*Polycentropus graciosa* Hamilton & Holzenthal, 2011
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*Polycentropus volcanus* Holzenthal & Hamilton, 1988
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*Polyplectropus adamsae* Chamorro & Holzenthal, 2010
*Polyplectropus alatespinus* Chamorro & Holzenthal, 2010
*Polyplectropus amazonicus* Chamorro & Holzenthal, 2010
*Polyplectropus andinensis* Chamorro & Holzenthal, 2010
*Polyplectropus beccus* Hamilton & Holzenthal, 2005
*Polyplectropus blahniki* Chamorro & Holzenthal, 2010

*Polyplectropus bolivianus* Chamorro & Holzenthal, 2010
*Polyplectropus brasilensis* Chamorro & Holzenthal, 2010
*Polyplectropus brborichorum* Chamorro & Holzenthal, 2010
*Polyplectropus clauseni* Chamorro-Lacayo & Holzenthal, 2004
*Polyplectropus colombianus* Chamorro & Holzenthal, 2010
*Polyplectropus corniculatus* Chamorro & Holzenthal, 2010
*Polyplectropus cressae* Chamorro & Holzenthal, 2010
*Polyplectropus cuzcoensis* Chamorro & Holzenthal, 2010
*Polyplectropus ecuadoriensis* Chamorro & Holzenthal, 2010
*Polyplectropus exilis* Chamorro-Lacayo & Holzenthal, 2004
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*Polyplectropus gaesum* Chamorro & Holzenthal, 2010
*Polyplectropus guyanae* Chamorro & Holzenthal, 2010
*Polyplectropus hollyae* Chamorro & Holzenthal, 2010
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*Polyplectropus hystricosus* Chamorro & Holzenthal, 2010
*Polyplectropus insularis* Chamorro & Holzenthal, 2010
*Polyplectropus juliae* Chamorro & Holzenthal, 2010
*Polyplectropus kanukarum* Chamorro & Holzenthal, 2010
*Polyplectropus kylistos* Chamorro-Lacayo & Holzenthal, 2004
*Polyplectropus maculatus* Chamorro & Holzenthal, 2010
*Polyplectropus manuensis* Chamorro & Holzenthal, 2010
*Polyplectropus matatlanticus* Chamorro & Holzenthal, 2010
*Polyplectropus minensium* Chamorro & Holzenthal, 2010
*Polyplectropus novafriburgensis* Chamorro & Holzenthal, 2010
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*Polyplectropus peruvianus* Chamorro & Holzenthal, 2010
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*Polyplectropus puyoensis* Chamorro & Holzenthal, 2010
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*Polyplectropus rodmani* Chamorro & Holzenthal, 2010
*Polyplectropus rondoniensis* Chamorro & Holzenthal, 2010
*Polyplectropus tragularius* Chamorro & Holzenthal, 2010
*Polyplectropus tripunctatum* Chamorro & Holzenthal, 2010
*Polyplectropus venezolanus* Chamorro & Holzenthal, 2010
*Polyplectropus woldai* Chamorro & Holzenthal, 2010
*Polyplectropus yolandae* Chamorro-Lacayo & Holzenthal, 2004
*Polyplectropus zamoranoensis* Chamorro & Holzenthal, 2010
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*Machairocentron chorotegae* Vilarino & Holzenthal, 2020
*Machairocentron eugeniarguedasae* Vilarino & Holzenthal, 2020
*Machairocentron kalinae* Vilarino & Holzenthal, 2020
*Xiphocentron moncho* Munoz-Quesada & Holzenthal, 1997

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*Alterosa holzenthali* Blahnik, 2005
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*Corydalus ralphi* Martins, Azevêdo, Hamada & Contreras, 2022
*Helicopsyche holzenthali* Johanson, 2003
*Helicopsyche ralphi* Cavalcante-Silva, Pereira & Calor, 2022
*Hydroptila holzenthali* Sykora & Harris, 1994
*Kisaura holzenthali* Phander & Saini, 2014
*Leucotrichia holzenthali* Thomson, Armitage & Harris, 2022
*Marilia holzenthali* Bueno-Soria & Rojas-Ascencio, 2004
*Metalype holzenthali* (Schmid, 1997)
*Neoathripsodes holzenthali* Dias, Quinteiro & Calor, 2015
*Notalina* (*Neonotalina*) *ralphi* Silva Pereira, Oliveira, Robson Desidério, Calor & Hamada, 2022
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